Attachment B
of
September 2003 Final Support Document

REFERENCE 7

DEQ SITE ASSESSMENT PROGRAM-STRATEGY RECOMMENDATION ADDENDUM

Site Name	Harbor Oil, Inc.
Site CERCLIS Number:	071803985
DEQ ECSI Number:	24
Site Address:	11535 N Force Ave. Portland, OR 97217
Recommendation By:	Leslie Kochan, Voluntary Cleanup and Site Assessment Section, DEQ Northwest Region
Approved By:	Michael E. Rosen, Manager, Voluntary Cleanup and Site Assessment Section, DEQ Northwest Region
Date:	February 19, 1998

NOTE: Gil Wistar, the Coordinator for DEQ's Site Assessment Section (SAS) program completed a Strategy Recommendation on Harbor Oil, Inc. on February 21, 1995. He recommended a medium priority for further investigation. He specifically recommended that the full extent of soil contamination should be evaluated including the Harbor Oil site and adjacent wetlands. He also recommended that the source of volatile organic compounds (VOCs) in groundwater beneath the site be investigated.

I agreed with his recommendation after reviewing site information on Harbor Oil as part of the review of all ECSI sites within the Columbia Slough Study Area. However, I felt that additional research on the ecological value of and any sampling in adjacent wetlands and Force Lake was necessary to determine whether a higher priority might be warranted. The purpose of this Strategy Recommendation Addendum is to summarize site history and present information from additional studies conducted in this area by the City of Portland and its consultants. In light of this new information, a high priority for further investigation of the Harbor Oil site is recommended.

Harbor Oil Site History: (This section summarizes site history. For more details, see Gil Wistar's February 21, 1995 Strategy Recommendation.) The site is located within a 47-acre parcel which is ECSI #1091 - Oregon Waste System-Proposed Transfer Station (OWS). The OWS site has been the location of many different facilities since the 1930s or 1940s. The Harbor Oil site is 4.2 acres and has had various operators on it since at least 1956 when an aerial photo

shows tanker trucks, a building, and a concrete slab and pond with areas of oil-stained soil on the site. See Attachment A, Figures 1 to 5, for maps of site location and facilities.

A November 1996 RCRA inspection describes Harbor Oil as a facility that primarily receives and processes petroleum wastes (used oil, off-specification fuels, oily or petroleum-contaminated wastewater). The facility was also managing a limited quantity of used oil filters and waste antifreeze in containers. Until some time in 1994, Harbor Oil operated a tank truck cleaning system that used trichloroethylene (TCE).

From about 1961 to 1974, Empire Industries operated an oil-recycling business at the site; during this time, a truck-cleaning company also operated on the site. Since 1973 various DEQ inspections have documented severe problems with discharges and runoff of oils into the surrounding wetlands and Force Lake.

A major release in 1974 spread oil over two acres of cattail marsh wetland and created a petroleum sheen over the entire surface of Force Lake. An estimated 400 or more fish were killed. Following this spill, DEQ staff described "a thin film of oil, and a thicker accumulation of oil, both fresh and decomposed, [which] had accumulated along the shorelines." The DEQ inspector also stated that the source of oil was very apparent and described an area just north and slightly east of the lake which was used as a work area by Industrial Cleaning Systems, Inc. located at 11535 North Force Avenue. This is the current address for the Harbor Oil site. He noted that two other signs were on the building, Empire Industries and Harbor Distributing.

The inspector described the work area as "a mass of oil-soaked mud, covered in places by abandoned tankers, ruined machinery, and other junk." He noted that there were large storage tanks, possibly for storing waste oils on the site. Along the south edge of the work area were several sumps filled with an oil/water mixture, which drained to Force Lake. This event is detailed in a March 1974 report titled "Investigation of Fish Kill at Force Lake, West Delta Park, Multnomah County." The report was written by Robert McHugh who was a DEQ staffperson at the time. (DEQ Water Quality files) A page from the report describing site and surrounding conditions is included as Attachment B.

Chempro bought the Empire business in 1974 and operated on the site until 1984. Chempro continued to discharge oil and grease into Force Lake (up to 10 mg/l) through an NPDES permit and continued to do so after the permit expired in 1977. A 1979 fire destroyed the facility and caused large volumes of oil and smaller volumes of waste paints to flow west and south across the site and into the wetlands and Force Lake. There is no record of subsequent cleanup. Chempro rebuilt the facility in 1980, leveling the property and covering it with gravel. Chempro then installed a 320,000-gallon bulk storage tank and a new tank farm. A pond was dug out on the southwest portion of the site to serve as an oil/water separator for the fuel/lubricating oil reclaiming facility.

In 1984 Harbor Oil bought the property. DEQ documented releases to wetlands from the oil/water separator in 1986. At this time, TCE was identified at 70 ppm in the truck wash sump and at lower levels in the oil/water separator, which received sump wastewaters.

A July 1991 investigation conducted on the OWS site by a consultant included the placement of seven monitoring wells on the Harbor Oil portion of the site. VOCs were identified in groundwater, a couple exceeding maximum contaminant levels (MCLs) (TCE at 11 ppb, benzene at 7 ppb). Most on-site soil samples contained total petroleum hydrocarbons (TPHs), with maximum levels of 13,700 ppm at 5 feet and 500 ppm at 10 feet. Three of 18 soil sample locations also contained TCE with a high of 60 ppb at 2.5 feet. Perchloroethylene (PCE) was found in one location at 92 ppb.

In August and September 1994 soil from the drainage ditch that runs between Limex Transportation, Inc. and Harbor Oil was sampled. Diesel/oils were found at 1,400 to 11,000 ppm. Following a November 1994 diesel spill from the Limex facility, some freshly contaminated soil was excavated from the wetlands, but DEQ suspended the cleanup after determining that an oily layer 16 inches below the surface represented preexisting contamination. Limex Transportation, Inc. was a shipping container business which began operating on the site sometime after 1990. It is likely that pre-existing contamination in the wetlands was the result of periodic spills and releases from the Harbor Oil site.

Impact of Harbor Oil to Adjacent Areas: The site is located about 200 feet north of Force Lake. Wetlands are located between the site and Force Lake and also dominate the area west of the site. The Oregon Slough is located north of Marine Drive and a dike, which is about 1,400 feet north of the Harbor Oil site. Stormwater runoff from some of the site is carried north towards the Oregon Slough by storm drains beneath Marine Drive. Some runoff flows south and west towards Force Lake and adjacent wetlands. For maps of these natural resource areas in relation to the Harbor Oil site, see Attachment C.

Depth to groundwater on the site is about 10 feet. The shallow groundwater north of the railroad tracks (which are located north of the Harbor Oil site) flows radially outward in all directions, and south of the railroad tracks, flows to Force Lake and the wetlands area.

The shallow groundwater aquifer and the underlying Troutdale Formation form a major regional aquifer that supports a number of high-yielding wells, including an industrial production well on the OWS property.

Deep and intermediate groundwater flow is both to the northwest towards the Oregon Slough and Columbia River and to the south away from the river, depending upon the season and river level changes.

Ecological Significance of Surrounding Area: A study of the Peninsula Drainage District No. 1 (Pen 1) drainage area, which includes the Harbor Oil site, was conducted by the City of Portland Bureau of Planning and adopted by the City Council in June 1997. The study, *Natural Resources Management Plan for Peninsula Drainage District No. 1*, focuses on wetland, wildlife and other natural resource values within the entire 900-acre drainage area of Pen 1.

The study was conducted in response to increased interest in the Columbia Slough in recent years. Runoff from the Pen 1 watershed is pumped to the Lower Columbia Slough. Implementation related to two regulatory programs within Pen 1 - the NPDES permit and TMDL programs - is intended to improve water quality in the Lower Slough as well as in Pen 1 sloughs and associated habitat. The Bureau of Environmental Services (BES) is the lead agency within the City to administer the Program Plan for this area. BES will conduct further testing of sediments and water quality, plant trees for shading, and create/enhance some wetlands for pollutant reduction in the Pen 1 sloughs.

Approximately 75 percent of the study area is publicly owned land. The remaining 25 percent is privately owned land zoned for industrial development. The Pen 1 area provides significant habitat for wildlife, storage capacity for storm water, water quality benefits, and recreational opportunities.

The study notes that one of the more "notable features is a blue heron rookery at the northwest corner of the site." It also states that with the exception of the Northwest Marsh, adjacent to the Great Blue Heron Rookery, the marshes are overwhelmed by a monoculture of reed canarygrass. The Northwest Marsh has a "remarkable diversity of native emergent wetland plants." In recent years the herons have begun to make use of other sites within Pen 1 for nesting, including near Force Lake. This wetlands area is immediately to the west of the Harbor Oil site and Force Lake is immediately south of the site.

No threatened or endangered plant species are know to occur in the study area. Bald eagles have been observed in the Pen 1 area (Heron Lakes Golf Course and in cottonwoods in the Portland International Raceway). Peregrine falcons and a state-listed Sensitive species, the tri-colored blackbird, have also been observed in Pen 1.

According to a 1989 study (Fishman Environmental Services), Force Lake is a small (about nine acres) and shallow (two to three feet deep) spring and seep-fed lake. It was originally connected to a series of other small lakes in the area, but is now connected only to the artificial lakes or water hazards on Heron Golf Course. Force Lake drains a fairly small surface area but the water level is maintained by groundwater inflow from the springs and seeps. A drainage system of buried tiles drains the lake through the adjacent wetland marsh on the north side, which in turn drains west and south towards the Columbia Slough. Force Lake currently supports fishing, remote control boating and birdwatching activities. The lake and surrounding wetland is the only known breeding and nesting area of the ruddy duck within Portland's Urban Growth Boundary (Bureau of Planning 1987).

Fisheries and Water quality studies - Peninsula Drainage District No. 1: Fishman Environmental Services - In May 1989, Fishman Environmental Services conducted a study of the potential for development of a warm-water fishery in Force Lake. Water quality data collected from Force Lake as part of this study found the lake to be very high in nitrate and total phosphorus, probably from golf course runoff and potentially from surrounding plants and even the contribution of waterfowl using the lake. Bottom sediments in the lake consist primarily of 0.5 to 2 feet of silty, thick mud. On several occasions a noticeable oily sheen was released from the

sediments when disturbed during seine hauls. Benthic organisms found in sediment samples were typical of those found in eutrophic lake sediments, indicating that release of contaminants, potentially from the golf course and/or Harbor Oil, may have impacted the health of the aquatic system.

Bureau of Planning, City of Portland Study - As part of the development of the *Natural Resources Management Plan for Peninsula Drainage District No. 1*, the City of Portland conducted water quality and sediment sampling within the Pen 1 area. Three areas were sampled including Force Lake. See Attachment D for a map of the sampling locations. The other locations - the intersection of Midwestern and Forebay Sloughs and the eastern end of Forebay Slough - are further south and probably not a concern in relation to Harbor Oil. One water sample (W-1) and one sediment sample (S-1) were collected from Force Lake. The results are shown in the following chart.

City of Portland 1992 Sampling in Pen 1

Samples/locations	Oil/Grease water/ (mg/l)	Oil/Grease sediment (mg/kg)	TPHs water/ (mg/l)	TPHs sediment (mg/kg)	Lead water/ (mg/l)	Lead sediment (mg/kg)	Lead /sediment TCLP (mg/l)
Force Lake (W-1 and S-1)	0.18	120	ND	180	0.126	18,600*	0.070
Midwestern and Forebay Sloughs (intersection) (W-2 and S-2)	0.17	11	ND	10	ND	ND	ND
Forebay (east end) (W-3)	0.08	NA	ND	NA	ND	NA	NA

* The lab analysis provided as Attachment 8 to the City of Portland study reports the lead finding in sediment as 18,600 mg/l. Since this level would be extremely high for TCLP and a TCLP analysis is presented for this sediment sample as well (0.070 mg/l), it is assumed that the unit used by the lab was incorrect and should have been mg/kg. Century Testing Laboratories, Inc. no longer has this data to confirm this assumption. The City of Portland Project Staff Manager for this study, agreed that this was a reasonable assumption.

Water and sediment samples were also analyzed for pesticides, semi-volatiles, volatiles and polychlorinated biphenyls (PCBs). The only pesticide detected in water was lindane in two samples (0.04 and 0.06 ppb) at levels well below the acute criteria for fresh water systems. There were no semi-volatiles, volatiles or PCBs found in the water samples above the detection limit. The only other substance identified was acetone in S-2 at 38 ug/kg.

While neither Oregon nor more local sediment standards are available, a review of sediment studies in Ontario, Canada's freshwaters and other U.S. water bodies, primarily bays offers some guidance to evaluating the lead level found in Force Lake. Under Ontario, Canada's *Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario*, the "lowest effect level" for lead in sediments is 31 mg/kg and the "severe effect level" is 250 mg/kg. NOAA Technical Memorandum NOS OMA 52, *The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program* established effects range-low (ER-L) and effects range-median (ER-M) values for metals and other contaminants by examining biological effects of contaminants in over 36 water bodies, primarily bays. The ER-L for lead is 35 mg/kg and the ER-M for lead is 110 mg/kg.

For a more local perspective, Steve Fortuna, Site Assessment Specialist for DEQ, compiled Corps of Engineer data from June-July 1997 to look at background levels of metals in the Columbia River and the Willamette River Portland Harbor. The mean level for lead in the Columbia River is 2.65 ppm and the mean for the Portland Harbor is 14.3 ppm.

In addition, the dissolved lead level in Force Lake (0.126 mg/l) exceeds EPA's acute freshwater toxicity criteria for lead, which is 0.082 mg/l.

Conclusions: There has been a long history at the Harbor Oil site, dating back to at least 1973, of releases of waste oil to surrounding wetlands and Force Lake. Extensive oil releases to Force Lake and surrounding wetlands were documented following a fish kill in 1974 and following a spill from a neighboring facility in 1994. Following both events, it was noted that extensive pre-existing contamination existed along the shoreline or in the wetlands. Groundwater contamination beneath the site by chlorinated solvents was documented in 1991. On-site soil sampling conducted at that same time identified high levels of TPHs.

A study released by the City of Portland in 1997 documented a very high lead level in the one sediment sample taken from Force Lake and also summarized the ecological significance of the wetland areas surrounding the Harbor Oil site. The origin of the lead is not known, but Harbor Oil may be a source, due to known releases of waste oil from the site to Force Lake. Waste oil often contains elevated lead levels.

Besides the known impacts the site has had on Force Lake and the surrounding wetlands, it potentially may have impacted the Columbia Slough and the Oregon Slough and may be responsible for groundwater contamination beneath the site.

References

DEQ ECSI #24, DEQ Water Quality file for Harbor Oil, Inc.

Force Lake Fisheries Evaluation, Fishman Environmental Services, Portland, Oregon, Prepared for Western Columbia Wetlands Conservancy, May 1989.

Natural Resources Management Plan for Peninsula Drainage District No. 1, Bureau of Planning, City of Portland, Oregon, Adopted by City Council June 12, 1997, Ordinance No. 171260.

Previous Studies and Investigations

In 1985, Ecology and Environment conducted a Preliminary Site Inspection of Chempro for the EPA. The conclusions of the report indicated that trichloroethylene (4500 ppb) and trans-1,2-dichloroethylene (2500 ppb) were found in elevated levels in the surface treatment pond.

The ODEQ conducted an inspection on November 12, 1987, to determine compliance with hazardous waste regulations. The following violations were observed: labeling on storage drums, posting emergency information, and submitting for analysis of the sludge in the wastewater tank. The violations were corrected, and after the analysis of the sludge, its disposal was said to be properly handled.

In December of 1988, the Jacobs Engineering Group submitted to the EPA the Final Report RCRA Land Disposal Restriction Compliance Inspection for Harbor Oil, Inc., in Portland, Oregon. During the investigation for the report, it was noted that Harbor Oil, did not provide inspectors with adequate characterization of the waste streams associated with waste oil sludges, waste oil tanks, and TCE sludge. It was also noted that the dates of accumulation of the stored wastes were missing.

The ODEQ conducted a hazardous waste generator inspection on June 18, 1992, to determine compliance with the hazardous waste regulations. The following violations were observed: hazardous waste being stored prior to obtaining a hazardous waste storage permit, contents of the stored drums were unknown, and no copies of land disposal restriction forms accompanying manifests used for shipping wastes off site on file.

The ODEQ conducted a hazardous waste generator inspection on February 16, 1994, to determine compliance with the hazardous waste regulations. The following violations were observed: hazardous waste being stored prior to obtaining a hazardous waste storage permit, contents of the stored drums not labeled as hazardous waste, and dates of accumulation of the stored wastes not marked.

In April of 1993, Harbor Oil was sent a Notice of Violation by the ODEQ relating to the June 18, 1992, and the February 4, 1993, inspections by the ODEQ. The violations are as follows: Unpermitted Storage of Hazardous Waste, and Failure to Characterize Waste, Failure to Retain Land Disposal Restriction Forms on File.

Current Regional Information

The 2-year, 24-hour rainfall event for the city of Portland is estimated to be 2.6 inches by the United States Department of Commerce. The net annual precipitation in Portland is 37.39 inches as estimated by the National Climatic Data Center.

There are no drinking water intakes associated with Force Lake. Drinking water for the site area is supplied by the city of Portland. The primary source of water for the city of Portland is the Bullrun watershed, located approximately 27 miles east of the city of Portland.

There are seven drinking water wells located within 4 miles of the site that range in depth from 163 feet to 252 feet bgs. The nearest three wells are located on Hayden Island, approximately

3/4 a mile to the northeast of the site, and serve a total population of 2,000.

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The Portland Mobile Home Court groundwater well is located approximately 1 3/4 miles to the southeast of the site and serves a population of 600. These wells are located upgradient from the Chempro site. An on site groundwater well was installed by the previous owner and is no longer used for domestic or industrial purposes.

Targets within 4 miles of the site include approximately 118,174 residents. There are no residences, schools, or daycare facilities within 200 feet of the site. It is assumed that there are six workers on site.

There is 1 mile of wetland frontage and approximately 40 acres of emergent wetlands associated with Force Lake. Within 5 miles of the site there are approximately 4632 acres of wetlands (U.S. EPA 1994).

Materials Reviewed for Harbor Oil, Inc.
Strategy Recommendation

DEQ ECSI file #24
Gil Wistar's Strategy Recommendation, 2/21/95.
EPA Memorandum, Recommendations for the Level I Site Inspection Prioritization, 9/17/94.
Correspondence.

DEQ Water Quality file
Investigation of Fish Kill at Force Lake, West Delta Park, Multnomah County, 1974.

DEQ RCRA file
Inspection report, 11/96.

Preliminary Environmental Site Audit, Waste Management of Oregon, Inc., Proposed Transfer Station Site, Sweet-Edwards/EMCON, 11/18/87.

Preliminary Site Assessment for Portland Stockyards, prepared by Golder Associates, Inc., 7/24/91.

Natural Resources Management Plan for Peninsula Drainage District No.1, Bureau of Planning, City of Portland, Adopted June 12, 1997.

Force Lake Fisheries Evaluation, Fishman Environmental Services, 5/89.

t. Thor Oil, Inc ECSI #2

SITE ASSESSMENT PRIORITIZATION SYSTEM (SAPS) GUIDANCE

Introduction

The Site Assessment Prioritization System (SAPS) is to be used as a tool in determining the priority associated with a site. The final decision regarding further action should include consideration of other factors not included in the SAPS. The overall priority may be upgraded or downgraded depending on site specific conditions. The upgrading or downgrading of the priority should be justified and documented under the "Discussion" section of the SAPS scoresheet. The following is the guidance to be used in completing the SAPS scoresheet. For each factor to be considered, determine the appropriate risk category and circle the correct numerical value on the scoresheet. At the same time, fill in the confidence value for that particular piece of information. The confidence values provide the site evaluator and persons who might later read the SAPS scoresheet, with information concerning the relative merit of the values used in completing the scoresheet. Fill out all of the factor values on the scoresheet. When adequate information cannot be obtained, make an educated guess based on what information you have, erring on the site of caution (when in doubt, assume the worst). Always use the most accurate and complete information to be obtained.

1. CONTAMINANT ROUTE CHARACTERISTICS (Potential to Release)

a. Hazardous Substance Containment

Assess the current containment conditions for all mechanisms used to contain hazardous substances at the site, including any mitigating measures already implemented. Assign an overall threat value based on the worst containment for any individual unit of consequence. Data sources: File information, interviews with owner/operators/ hazardous waste manifests, or permits.

Special Considerations

- *Evaluate intact below-ground containers or tanks as a landfill.*
- *If contaminated materials/soil have been excavated or disturbed and are stored above grade, the contaminated material is to be evaluated as a waste pile.*
- *Dry wells, drainfields or leaking underground storage tanks are to be evaluated as contaminated soil.*
- *Evaluate a dry surface impoundment as a waste pile.*

Containers (includes drums, above-ground tanks, non-drum containers, etc.)

Drums are portable containers designed to hold a standard 42-50 gallons of hazardous substances (dependent upon the materials volatility or thermal expansion). Tanks and Non-Drum Containers are considered any stationary device, designed to contain accumulated wastes, constructed primarily of fabricated materials (such as wood, concrete, steel or plastic) that provide structural support; or any portable or mobile device in which the hazardous substance is stored or otherwise handled.

HIGH:	Evidence of hazardous substance migration from containers (bulging drums, ruptured drums, etc) and secondary containment is not present or is inadequate.
MEDIUM:	Evidence of hazardous substance migration from containers (bulging drums, ruptured drums, etc) but secondary containment is adequate. OR No evidence of migration, but containers are in fair to poor condition and secondary containment is not present or is inadequate.

LOW: No evidence of migration, but containers in fair to poor condition and secondary containment is adequate. OR Containers properly sealed and in good condition but secondary containment is not present or is inadequate.

NO THREAT: Containers properly sealed and in good condition with adequate secondary containment system.

Landfills

A Landfill is an engineered hole in the ground into which hazardous substances have been disposed by backfilling. For this evaluation, liners of intact below ground containers or tanks are considered secondary containment (ie. double-walled tanks or single walled tanks with a lining in the excavation). Double liners are considered tanks with corrosion protection and secondary containment. Tanks retrofitted with an interior liner should be treated as single-walled tanks.

HIGH: No liner present or installed liners are defective or failing. Leachate collection system is not present or is not functioning. Run-on/runoff control or cover are not present or ponding of water observed on top of landfill. Free/bulk liquids are documented to have been disposed in the landfill (such as from a tank truck)

MEDIUM: Possible disposal of free liquids in landfill. Unmaintained run-on/runoff control system or cover OR Presence of liner, cover, or leachate collection system unknown.

LOW: Single liner with no evidence of improper installations or failures. Compacted soil or low permeability cover installed, but with poor or unknown maintenance performed. Leachate collection system present but unmaintained or in unknown condition. Possible disposal of free liquids in the landfill.

NO THREAT: Double liner system, no evidence of improper installation or failure. Maintained, engineered cover without ponding. Engineered, maintained run-on/runoff control system. Maintained, functioning leachate collection system. Free liquids were not disposed of in the landfill.

Surface Impoundments

A Surface Impoundment is a topographic depression, excavation, or diked area, primarily formed from earthen materials (lined or unlined) and designed to hold accumulated liquid wastes, wastes containing free liquids, or sludges that were not backfilled or otherwise covered during periods of deposition.

HIGH: Unsound diking with evidence of failure or leakage. No engineered, low permeability liner or installed liners are defective or failing. Insufficient freeboard (liquid level within 2 feet of top of diking). Observed changes in fluid levels. No cover, but mixing or agitation processes (aeration, spraying, or other circulation process) are present.

MEDIUM: Unsound diking with no evidence of failure or leakage. Unknown if liner is present. Insufficient freeboard (liquid level within 2 feet of top of diking). Observed changes in fluid levels.

LOW: Unmaintained diking but apparently sound. Single liner with no evidence of improper installations or failures. Sufficient freeboard (> 2 feet) manually maintained. No evidence of loss of fluid contents. No cover, but no mixing or agitation processes are

present.

NO THREAT: Double liner system with no evidence of improper installation or failure. Regularly inspected and maintained diking. Sufficient freeboard (> 2 feet) automatically maintained. No evidence of loss of fluid contents. maintained cover which may include enclosure on top of impoundment, floating objects used to decrease surface area or a floating additive (such as a non-volatile floating liquid) used to control volatilization.

Spills, Discharges, and Contaminated Soil

Contaminated Soil is considered soil (at the ground surface or below) onto which available evidence indicates that hazardous substances were spilled, spread, disposed, or deposited.

HIGH: Contamination due to liquid hazardous substances and no groundwater and/or product recovery system in place (including leaking underground storage tanks, dry wells, septic drainfields). OR Contamination at the surface with no run-on/runoff control or unknown controls at location where surface slope allows off-site migration.

MEDIUM: Contamination due to liquid hazardous substances and a functioning groundwater and/or product recovery system in place. OR Contamination from solid materials and extending to a depth greater than one foot. OR Contamination at the surface with no run-on/runoff controls or unknown or unmaintained controls in a location where the surface slope prevents off-site migration.

LOW: Contamination due to surficial soil (less than one foot depth) contamination and no cover present over contaminated material. OR Contamination is present at the surface in an area with maintained run-on/runoff controls. (Note: storm drains that discharge to surface water without treatment are not runoff controls).

NO THREAT: Spill of any type has been removed to background ("non-detect") based on adequate sampling.

Waste Piles

A waste pile is any non-containerized accumulation above the ground surface of solid, non-flowing wastes; includes open dumps.

HIGH: Waste pile is stored outdoors and is uncovered. No liner or base are present. Run-on/runoff control is not present.

MEDIUM: Waste pile is stored outdoors and is uncovered but liner and run-on/runoff control are present. OR Waste pile is outdoors with partial or unmaintained cover. Presence of liner or run-on/runoff control unknown. OR Waste pile outdoors with intact maintained cover with no liner or base.

LOW: Liner is present as a single geomembrane or clay layer. Waste pile outdoors with intact maintained cover OR Waste Pile is in a non-intact building (roofed with no walls) or in a three-sided roofed structure.

NO THREAT: Waste pile located in fully enclosed, intact building or structure. Double liner or impervious base present. Maintained engineered run-on/runoff control.

b. Depth to Aquifer

*The vertical depth to groundwater can affect how quickly a hazardous substance might reach the water table, based solely on the distance a substance must travel. Depth to groundwater is measured from the bottom of the hazardous source area or the greatest depth of known soil contamination for a site to the water table. **Verified releases to groundwater which are attributable to the site, are to be assigned a HIGH priority.** Data source: Well logs (domestic, monitoring) or regional geological reports.*

HIGH:	Depth to groundwater of 0 - 25 feet 10 feet
MEDIUM:	Depth to groundwater of 26 - 100 feet
LOW:	Depth to groundwater of 101 - 300 feet
NO THREAT:	Depth to groundwater greater than 300 feet, or presence of regional hydraulic barrier (confining layer) to prevent vertical migration of contaminants to groundwater.

c. Distance to Nearest Drinking Water Well

*Measure the distance from the hazardous source areas to the nearest drinking water well, not from the center of site or property boundary. Wells that have been abandoned, and are documented as such, are not to be evaluated. **If the nearest well is located within the contaminated area or is contaminated with a hazardous substance attributed to the site, the site should be assigned a HIGH priority.***

HIGH:	< 1/2 mile
MEDIUM:	> 1/2 - 1 mile
~~LOW:~~	> 1 - 2 miles Industrial production wells located in immediate area. However, any drinking water wells not likely within 2 miles as City of Portland water available. Proposed City of Portld well field >2 miles from site
NO THREAT:	> 2 miles

d. Soil Permeability

*Surface soil permeability measures the tendency of a liquid to permeate soil. Subsurface soil permeability can be used to measure how easily substances move from the land surface to the aquifer. Where information regarding multiple subsurface layers is available, evaluate the least permeable layer if it appears to be continuous under the site and free of fractures or faults and has a minimum thickness of 15 feet. If this layer is not thought to be continuous or free of fractures and faults, use information regarding the most prevalent geologic layers influencing transport at the site. **Evaluate using subsurface soil criteria when groundwater is the pathway of concern. Evaluate using surface soil criteria when surface water is the pathway of concern. When both pathways are of concern use the criteria that generates the highest priority.** Where Site Specific soil (surface or sub-surface) information is not available, use soil descriptions obtained from the appropriate US Soil Conservation Service Soil Survey.*

HIGH: Sandy fill & gravels	Subsurface Soils: Well-sorted sand, sand and gravel, gravel, highly fractured rock, lava tubes, slightly silty sand, poorly lithified sandstone. OR Surface Soils: Clay (organic and inorganic), clay loam, rock outcrop, peat, peaty clay.

MEDIUM: **Subsurface Soils:** Sandy silt, silty sand, permeable till, clayey sand, cemented sandstone, fractured rock, shale, porus volcanic rock. OR **Surface Soils:** Clayey sands, sand-clay mixtures, clayey gravels, clay-sand-gravel mixtures, inorganic silts, clayey silt loam, silty clay loam, porous rock outcrop, sandy silty clay, sandy clay, sandy clay loam.

LOW: **Subsurface Soils:** Clayey silt, silty clay, moderately permeable till, silty shale, siltstone, slightly fractured igneous or metamorphic rock, welded/lignified volcanic rock. OR **Surface Soils:** Poorly-graded sands with fines, silt-sand mixtures, loam, silt loam, sandy silt loam, clayey sand, clay sandy loam.

NO THREAT: **Subsurface Soils:** Unfractured igneous or metamorphic rock (including dense, competent basalt) unfractured shales, claystones, mudstones, clay, slightly silty clay, low permeability till. OR **Surface Soils:** Sand, gravel, sandy gravel, well-graded sand, well-graded gravel, gravelly sand, gravelly sandy loam, sandy loam, silty sandy loam.

e. Distance to Surface Water

Distance to the nearest fresh or marine surface water downslope of the area of contamination. Man-made lakes, irrigation canals, or ditches are considered surface waters if they are connected to natural surface waters. Intermittent streams and playa lakes are also considered surface water. Include the overland flow path when determining the distance to surface water. If surface water discharges to a storm drain, include the distance within the storm drain in evaluating the distance to surface water.

HIGH: < 1000 feet 200 ft. north of Fern Lake

MEDIUM: 1,001 - 5,000 feet

LOW: 5,001 - 10,000 feet

NO THREAT: > 10,000 feet

2. HAZARDOUS SUBSTANCE CHARACTERISTICS

a. Source Quantity

The source quantity is the total quantity of materials containing hazardous substances where a release has occurred or a threat of a release exists. Scoring should be based on the quantity released or has the potential to release and not the quantity stored. If no information is available regarding source quantity, assign a HIGH priority for source quantity.

Special Considerations:

- *For tanks or impoundments periodically filled and emptied, calculate the volumes based on their usage or filled volumes.*
- *For landfills, the actual volume of the landfill should not be used when surface water, direct contact, or air are the pathways of concern. Instead, the areal extent of the landfill should be determined and multiplied by a 0.5 foot depth. When groundwater is the pathway of concern, use the actual volume of the landfill or estimate the volume by multiplying the estimated areal extent by the estimated average landfill depth. If average depth information is unavailable use a 3 foot depth default. If groundwater to surface water discharge is possible, the site should be evaluated using the ground water pathway conditions.*

- *Estimate areal extent of soil contamination when surface water, direct contact, or air are the pathways of concern. If contaminated soil quantity must be added to other waste quantities on-site, convert to cubic yards by assuming a 0.5 foot depth. Estimate the volume of soil contamination (assume a depth of 3 feet if depth is unknown) when groundwater is the pathway of concern. The following factors should be considered in estimating the area of contaminated soil:*

  - *Areal extent of visible contamination (such as discolored soil or stressed vegetation)*
  - *Practice that resulted in soil contamination and distribution of site features. (for example, drums of hazardous substances would probably have been emptied onto an open area with easy access rather than areas with physical barriers or covering vegetation such as woods or overgrowth).*
  - *Extent of contamination inferred from site sampling.*

Use the following conversions to determine source quantity:

1.5 tons = 1 cubic yard = 4 drums = 200 gallons

	Cubic Yards	Square Feet
HIGH:	> 625	> 400,000
MEDIUM:	6 - 625	5000 - 400,000
LOW:	1 - 5	< 5000
NO THREAT:	No hazardous substances present	

1979 - major release of oil created petro. sheen over entire surface Ford Lake. Site described as "mass of oil-soaked mud" and several sumps filled w/ oil/water mixture drained to Ford Lake.
1979 - fire destroyed facility & large volumes of oil & paint waste flowed across site to wetlds & Ford Lake. No record of cleanup.
1986 - documented releases to wetld.
1994 - 16 inches of preexisting oily contamination noted in wetlds.

b. Toxicity/Persistence

Human toxicity data are used to evaluate the toxicological effects through three exposure routes: oral (ingestion), inhalation, and dermal contact. The surface water and groundwater pathways consider oral toxicity. The air pathway considers inhalation toxicity. The direct contact pathway, in addition to considering oral toxicity considers the effects from absorption through the skin.

The human toxicity data used come from five types of toxicity measurements: Acute, Chronic, Carcinogenicity, Developmental and Reproductive, and Dermal Contact. The source of information for toxicity is the Oregon Hazardous Substance Database (printouts are attached as Appendix A). For each hazardous substance, the database gives a single score between 1 and 14 based on these measurements. From Appendix A, obtain a toxicity score for the pathway of concern and assign a priority as described below. If more than one pathway is of concern, assign the highest priority.

HIGH: Toxicity Score is between 10 - 14 lead from waste oils

MEDIUM: Toxicity Score is between 5 - 9

LOW: Toxicity Score is less than 4

NO THREAT: No hazardous substances present

c. Water Solubility

Use Table 1 to determine the priority associated with the water solubility (mg/l) for organic and inorganic substances (other than those shown in Table 2). Use Table 2 to determine the priority associated with select inorganic substances (cations and anions). Use the contaminant mobility that gives the highest priority.

pecial Considerations:

- ***Assign a HIGH priority, regardless of the compound's solubility, if the substance or material is present as a free liquid (or as a separate layer) in the groundwater.***
- *When evaluating contamination due to petroleum products (gasoline, diesel, and oil), use the components of petroleum which are of greatest concern (eg. benzene, ethylbenzene, toluene, xylene). If constituent specific analytical data, other than TPH, indicate that these substances (one or more) are not present, then evaluate for those substances that are present.*
- *If the concentration of a substance in a mixture is known and indicates a higher concentration than the solubility in water, substitute the substance concentration (mg/l) for the solubility (use Table 1).*
- ***For chromium, nickel, lead, cobalt, and copper, increase the mobility priority to the next level (eg. low to medium) if acid leachate (pH < 3) is present or the metals are present in solution in liquid hazardous substances (eg. plating wastes).***
- ***Decrease the mobility priority to the next level (eg. medium to low) for a metal in areas with alkaline soils (pH > 8), if it can be determined that the metal is present in a solid form. This does not apply to selenium and arsenic, which are more mobile under alkaline conditions.***

ABLE 1 - Water Solubility

IIGH: > 1000 mg/l 1991 TCE in groundwater

AEDIUM: 101 - 1000 mg/l

OW: 1 - 100 mg/l or solubility unknown

IO THREAT: No hazardous substances present.

ABLE 2 - Mobility Priority for Cations and Anions

IIGH:	Aluminum, Chromium, Thallium, Thorium, Tin
AEDIUM:	Barium, Beryllium, Cobalt, Copper, Lead, Manganese, Nickel, Phosphorus
OW:	Antimony, Arsenic, Boron, Bromine, Cadmium, Fluorine, iodine, Magnesium, Mercury, Molybdenum, Radium, Radon, Selenium, Silver, Uranium, Vanadium, Zinc
IO THREAT:	No hazardous substances present.

3. EXPOSURE POTENTIAL

3. Groundwater Use

Determine the predominant groundwater use within 2 miles of the site. Data sources: USGS Topographic Map, Oregon Water Rights Database, OHD Drinking Water Database.

HIGH: Federally-designated sole source aquifer. OR Public Supply (greater than 3 connections or 10 users) no alternate unthreatened sources available with minimal hookups. OR Private Supply, no alternate unthreatened sources available.

MEDIUM: Public supply, but alternate sources available with minimum hook-up requirements. OR Private Supply but alternate sources available with minimum hook-up requirements. OR Groundwater used solely for irrigation of food crops or livestock watering.

LOW: Groundwater used solely for irrigation of non-food vegetation crops (parks, golf courses, tree farms and nurseries). OR Groundwater not used but usable. Grdwater feeds Force Lake & cd impact Columbia Slough

NO THREAT: Groundwater not usable (for example, high dissolved solids or brackish). This does not include groundwater made unusable due to contamination - this should be evaluated as it was used prior to contamination.

b. Land Use/Population

Force Lake & surrounding wetlds - recreational use - fishing, bird-watching

Determine the predominant land use within 0.5 miles of the site. Data sources: USGS topographic map, aerial photographs, site drive-by, site visit, City/County zoning.

HIGH: Residential. OR Parks, Schools, Day-care Facilities, Playgrounds, Fairgrounds, or Public Facilities which draw people to the area, which are present within 1000 feet of the contaminated area.

MEDIUM: Rural residential OR industrial OR commercial

LOW: Agricultural and/or minimal working transient population and no residential population.

NO THREAT: Isolated areas with no working transient population and no residential population.

c. Surface Water Use

Determine the predominant surface water use within 2 miles of the site. Data sources: USGS Topographic map, Water Rights Database, Oregon Rivers Database.

HIGH: Use of water for drinking purposes, within 2 miles downstream of probable point of release.

MEDIUM: Use of water for significant fishing, food crop irrigation, livestock watering, or contact recreation within 2 miles downstream of probable point of release.

LOW: Use of water for non-food crop irrigation, industrial, or non-contact recreation within 2 miles downstream of the probable point of release.

NO THREAT: Water within 2 miles downstream is not used for any purpose. This does not include surface water made unusable due to contamination - this should be evaluated as it was used prior to contamination.

I. Sensitive Environments

Determine the distance to the nearest sensitive environment. Sensitive environments are considered:

- *Critical habitat for federally designated endangered or threatened species*
- *National Park, Monument, National Marine Sanctuary, National Recreation Area, National Wildlife Refuge, National Forest (campgrounds, recreation area, game management areas, wildlife management areas)*
- *Designated Federal Wilderness Area*
- *Wetlands (freshwater, estuarine, or coastal-5-acre minimum)*
- *Wild and scenic rivers*
- *State Parks*
- *State Wildlife Refuges*
- *Habitat designated for State endangered species*
- *Fisheries resources (area necessary for the maintenance of spawning or migratory pathways for anadromous or resident fish species)*
- *State designated natural areas*
- *County or municipal parks*

HIGH: Sensitive environments present within (<) 1,000 feet. Significant urban green space & wildlife habitat ; potential as more significant fishing.

MEDIUM: Sensitive environments present within 1,001 - 5,000 feet.

LOW: Sensitive environments present within 5,001 - 10,000 feet.

NO THREAT: Sensitive environments present > 10,000 feet or not present.

e. Direct Contact

Assess the ability for an outside person to come in contact with hazardous substances at the site. Direct contact is not limited to hazardous substances at the surface. It can include (but not limited to) contaminated drinking water, subsurface soil contamination which could be accessed by utility workers. Data Source: Site files, photographs, site drive-by or site visit.

HIGH: Direct contact with hazardous substances likely or known.

MEDIUM: Direct contact with hazardous substances possible.

LOW: Direct contact with hazardous substances unlikely. Oil-contaminant sediments in Foxe Lake - used for fishing ; oil-contaminated soils & subsurface in wetlands bordering Lake

NO THREAT: Direct contact with hazardous substances not possible.

4. EVALUATOR ASSESSMENT OF THREAT

Identify your personal assessment of the threat posed by the site to the surrounding population and environment based on all of the information you have concerning the site, not only the general site characteristics identified above.

HIGH: Site may pose a great threat - human health, environmental targets, or environment in general have been or are being impacted by this site

MEDIUM: Site may pose a moderate threat - degradation of soil, groundwater, or air through release of hazardous substances. Minor impacting of human health or environmental targets possible.

LOW: Site is likely to pose little threat - impact of site limited to localized degradation of soil, or minimal degradation of groundwater, surface water, or air where targets are not present.

NO THREAT: Site has had no impact on the environment, and is likely to pose no threat to the surrounding population or environment.

GENERAL SCORING GUIDELINES

The following are the recommended guidelines for determining a course of action for a site based on the generated SAPS score. Please remember that numbers put forth below are only guidelines; the final decision made regarding what state action should be taken for the site should include consideration of other factors not included in the SAPS.

RECOMMENDED ACTION	SAPS SCORE
Further Action - High Priority	81 - 110 93
Further Action - Medium-High Priority	71 - 80
Further Action - Medium Priority	56 - 70
Further Action - Medium-Low Priority	46 - 55
Further Action - Low Priority	26 - 45
No Further Action*	0 - 25

* Determinations of No Further Action must be based not only on the SAPS score, but must be approved by the Regional Site Assessment Manager.

USE OF CONFIDENCE VALUES

Confidence values should be assigned for each of the factors on the SAPS scoresheet. These confidence values provide the site evaluator, and persons who might later read the SAPS scoresheet, with information concerning the relative merit of the values used in completing the scoresheet. The following is a listing of the confidence value symbols to be used.

CONFIDENCE VALUE	DESCRIPTION
A	Information is a known, either from sampling results, research, of because it is accepted knowledge.
B	Best estimate; based on at least some knowledge of information relevant to the factor being considered
C	Educated guess; based on little or no information.

It is recommended that the use of information falling into the latter category be limited whenever possible. Remember, the more that this type of information is used in completing a SAPS scoresheet, the greater the chance that the score generated is incorrect. Scores generated based largely on questionable information are of little or no value!